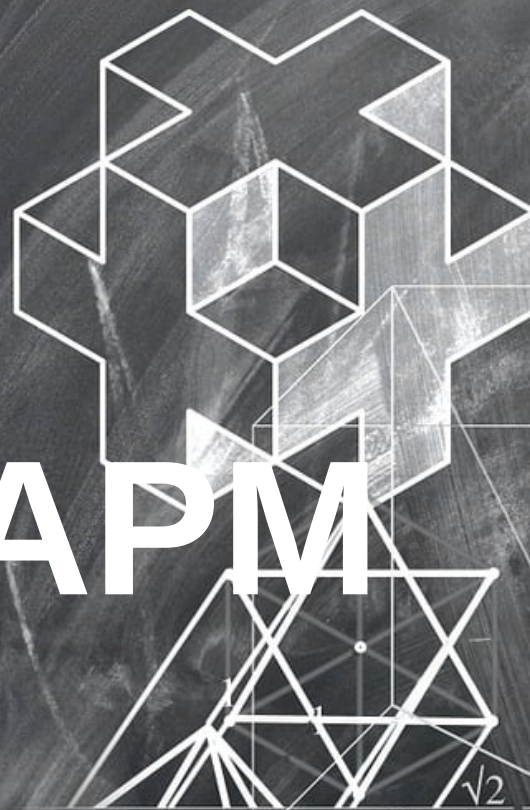




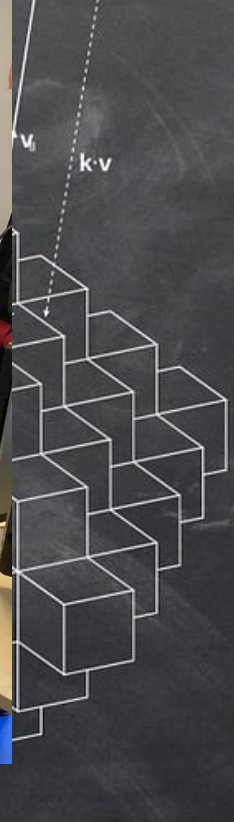
# APM

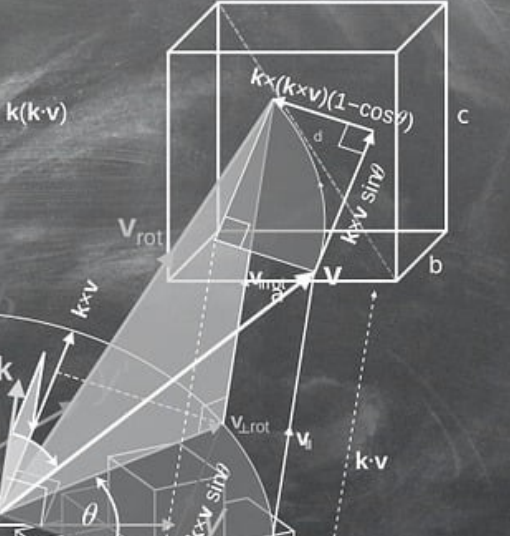
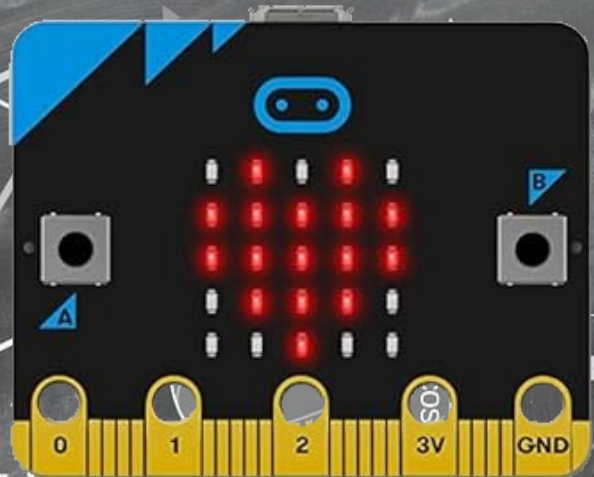
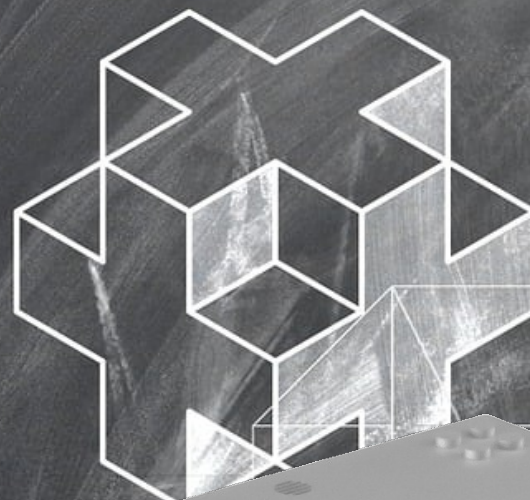


$$\begin{aligned} \mathbf{v} &= \mathbf{v}_0 + \mathbf{v}_1 \\ \mathbf{v}_0 &= k(\mathbf{k} \cdot \mathbf{v}) \\ \mathbf{v}_1 &= \mathbf{v} - k(\mathbf{k} \cdot \mathbf{v}) \end{aligned}$$



Punktspiegelung

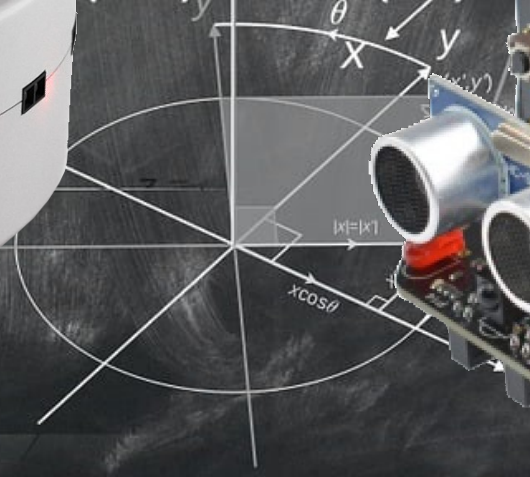




$$r = r_{||} + r_{\perp}$$

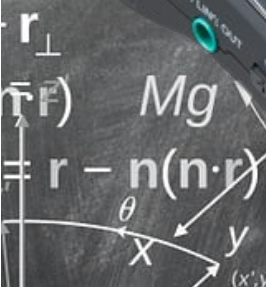
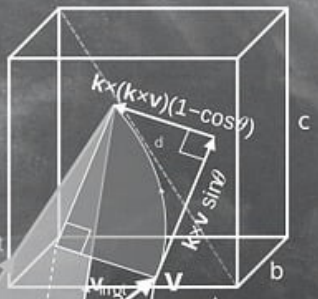
$$r_{||} = n(n \cdot r) \quad Mg \downarrow$$

$$(n \times r) = r - n(n \cdot r)$$





$$\begin{aligned}
 \mathbf{v} &= \mathbf{v}_0 + \mathbf{v}_1 \\
 \mathbf{v}_0 &= k(\mathbf{k} \cdot \mathbf{v}) \\
 \mathbf{v}_1 &= -\mathbf{k} \times (\mathbf{k} \times \mathbf{v}) = \mathbf{v} - \mathbf{k}(\mathbf{k} \cdot \mathbf{v})
 \end{aligned}$$



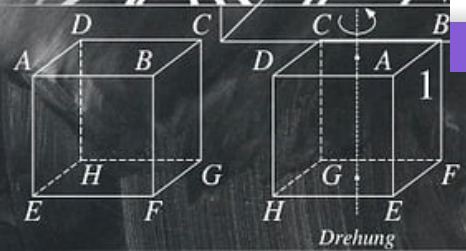
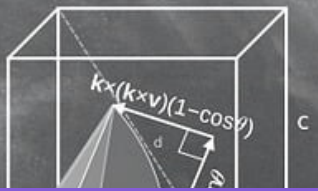


Scratch interface showing a code editor with the following script:

```
when green flag clicked
  go to x: -43 y: 128
  turn 90 degrees
  say 3 for 0.5 seconds
  say 2 for 0.5 seconds
  say 2 for 0.5 seconds
  say GO!!! for 0.5 seconds
  loop forever
    if up arrow pressed? then
      go forward 2 steps
      if pink touched? then
        go to x: -43 y: 128
        turn 90 degrees
        say ZUT for 2 seconds
    if left arrow pressed? then
      turn 5 degrees
    if right arrow pressed? then
```

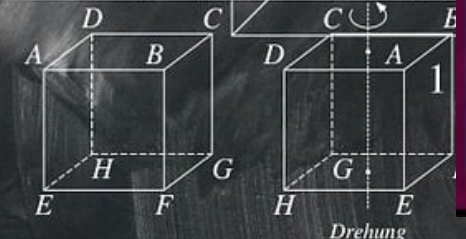
The interface also shows a stage with a colorful oval track and a sprite area with two car sprites: 'voiture rouge' and 'voiture jaune'.

$$\begin{aligned} \vec{v} &= v_0 + \vec{v}_1 \\ \vec{v}_1 &= k(k \times \vec{v}) \\ \vec{v}_1 &= -k \times (k \times \vec{v}) = \vec{v} - k(k \cdot \vec{v}) \end{aligned}$$





$$\begin{aligned} \vec{v} &= \vec{v}_0 + \vec{v}_1 \\ \vec{v}_0 &= k(\vec{k} \cdot \vec{v}) \\ \vec{v}_1 &= -k \times (k \times \vec{v}) = \vec{v} - k(k \times \vec{v}) \end{aligned}$$



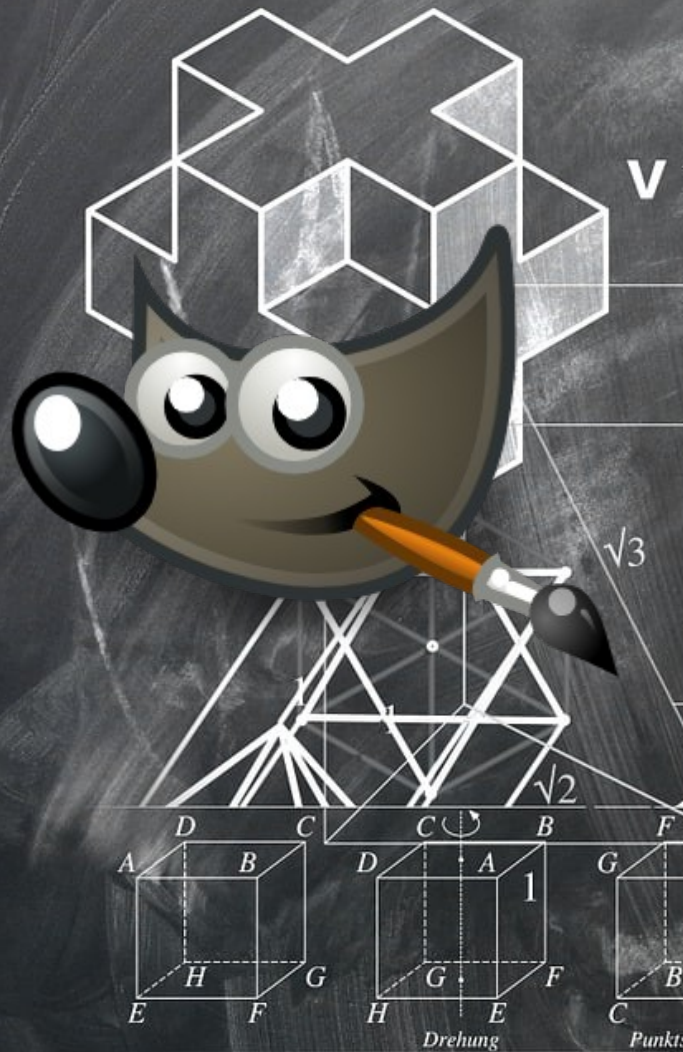
Objectif : 11/11

**Départ**

- Déplacer en avant
- Déplacer en avant
- Tourner vers la gauche
- Frapper !
- Tourner vers la droite
- Déplacer en avant
- Déplacer en avant
- Déplacer en avant
- Tourner vers la droite
- Déplacer en avant
- Déplacer en avant

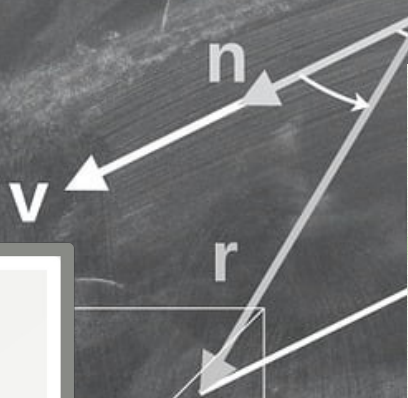
Punktspiegelung



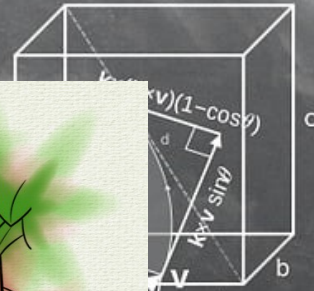


Drehung

Punktspiegelung



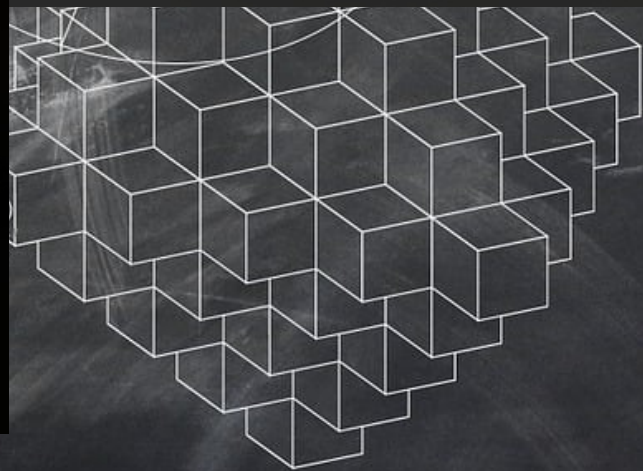
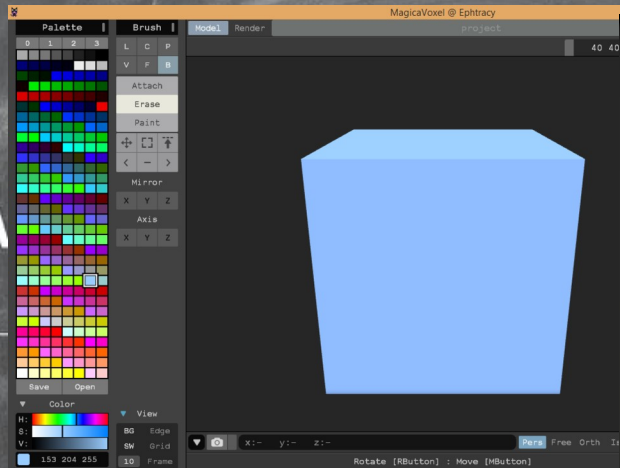
$$v = v_{\parallel} + v_{\perp}$$

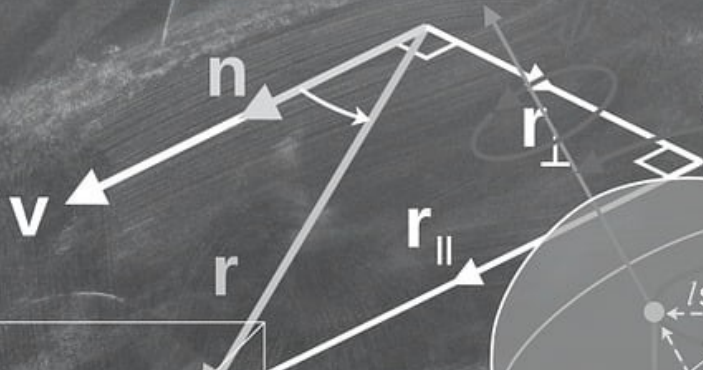


$$r = r_{\parallel} + r_{\perp}$$
$$r_{\parallel} = n(n \cdot r)$$
$$r_{\perp} = -n \times (n \times r)$$

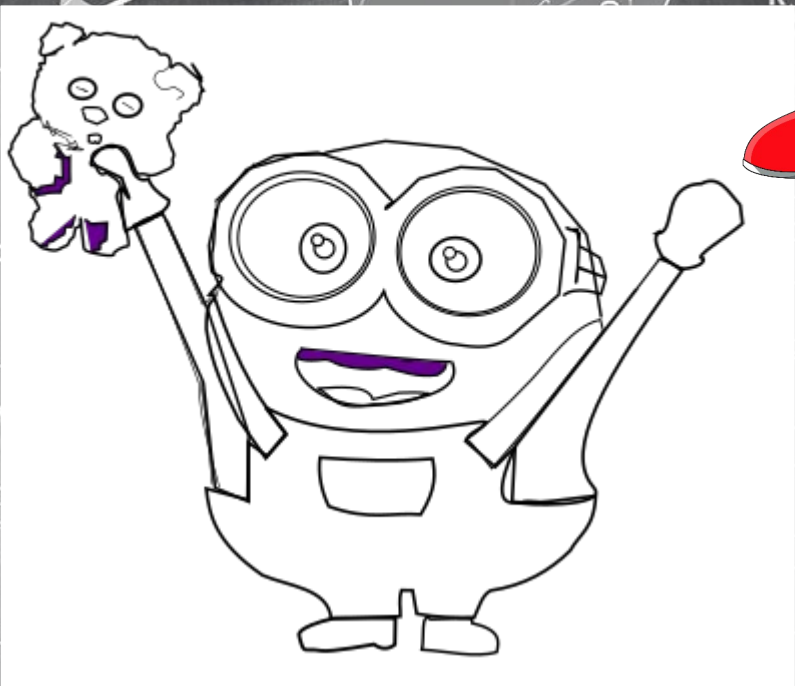
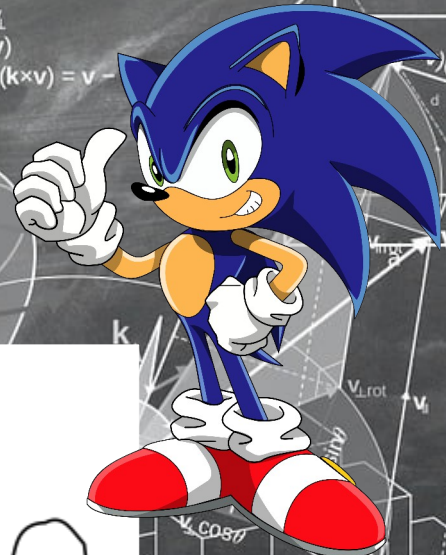








$$\begin{aligned} \mathbf{v} &= \mathbf{v}_0 + \mathbf{v}_1 \\ \mathbf{v}_0 &= k(\mathbf{k} \cdot \mathbf{v}) \\ \mathbf{v}_1 &= -\mathbf{k} \times (\mathbf{k} \times \mathbf{v}) = \mathbf{v} - \mathbf{v}_0 \end{aligned}$$



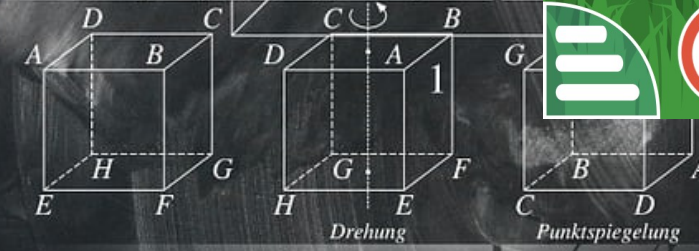
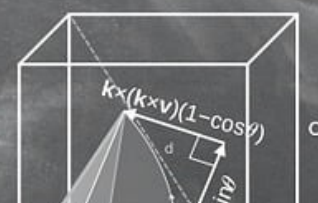
Drehung

Punktspiegelung

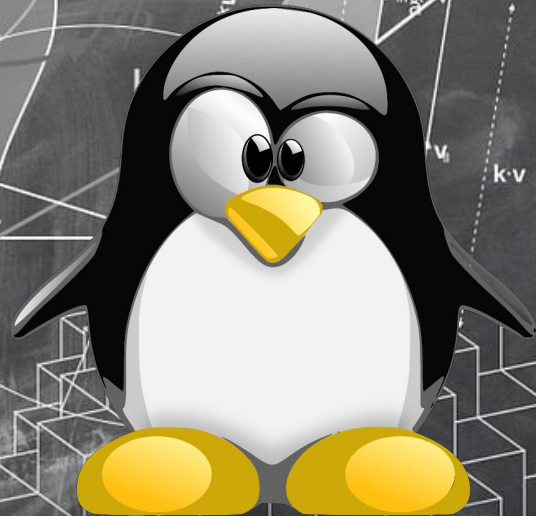


Clavier basique	Un logiciel de traitement de texte basique	Associations géométriques	Envoie la balle à Tux	Clique et dessine	Clique sur les poissons	Déplace la souris ou touche l'écran			

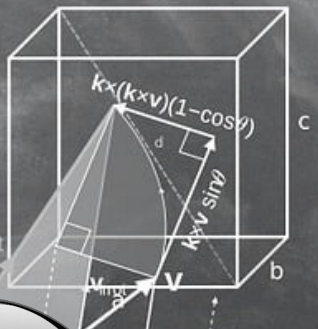
$$\begin{aligned} v &= v_0 + v_1 \\ v_{||} &= k(k \cdot v) \\ v_{\perp} &= -k \times (k \times v) = v - k(k \cdot v) \end{aligned}$$



# Linux™



$$\begin{aligned} \mathbf{v} &= \mathbf{v}_0 + \mathbf{v}_1 \\ \mathbf{v}_0 &= k(\mathbf{k} \cdot \mathbf{v}) \\ \mathbf{v}_1 &= -\mathbf{k} \times (\mathbf{k} \times \mathbf{v}) = \mathbf{v} - k(\mathbf{k} \cdot \mathbf{v}) \end{aligned}$$



$$\mathbf{r}_\perp = -\mathbf{n} \times (\mathbf{n} \times \mathbf{r}) = \mathbf{r} - \mathbf{n}(\mathbf{n} \cdot \mathbf{r})$$



RésLab